Tanta University

Department: Computer and Automatic Control Engineering
Total Marks: 20 Marks

Faculty of Engineering

Course Title: Digital Signal Processing	Course Code: CCE3116	Year: 3rd
Date: 1-12-2015 (Mid term exam)	Allowed time: 1.5 hrs	No. of Pages: (1)

Answer the following questions.

Problem number (1) (10 Marks)

(a) Consider the discrete-time sequence $x(n)$:

$$x(n) = \{2, 1, 1, \underset{\uparrow}{1}, -1, -1, -2\}$$

Sketch

(i) $x(-n)$
(ii) $x(n)\, u(n-2)$
(iii) $x(2-n)$
(iv) $x(-2-n)$

(b) State whether the following system are static, linear, shift invariant, causal, and stable or not.

(i) $y_1(n) = x(n^2)$

(ii) $y_2(n) = x^2(n)$

(iii) $y_3(n) = 2^n \,.\, x(n)$

Problem number (2) (6 Marks)

(a) Find the inverse Z-Transform of the following function:

$$X(z) = \frac{z+4}{(z-1)^2} + \frac{3}{z+1}$$

(b) Determine the 4-point DFT of the following discrete-time sequence:

$$x(n) = \{1, 0, 1, 0\}$$

Problem number (3) (4 Marks)

Compute the circular convolution, $y(n) = x_1(n)\ (5)\ x_2(n)$, where

$$x_1(n) = \{1, 1, 0, -1, 1\}$$
$$x_2(n) = \{1, 2, 2, 1, 1\}$$

Good luck

Dr. M. Arafa